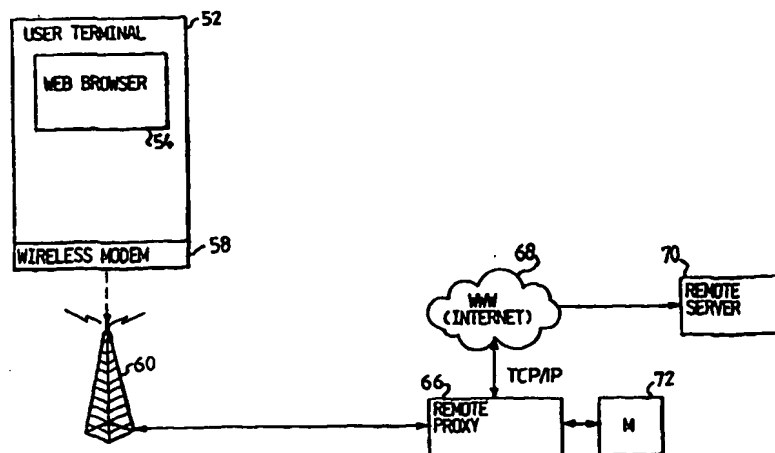




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>G06F 17/30</b>		A1	(11) International Publication Number: <b>WO 99/64967</b>
			(43) International Publication Date: 16 December 1999 (16.12.99)
(21) International Application Number: PCT/SE99/00992 (22) International Filing Date: 8 June 1999 (08.06.99) (30) Priority Data: 9802098-5 12 June 1998 (12.06.98) SE (71) Applicant: TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE). (72) Inventors: NILSSON, Mikael; Vasagatan 5A, S-652 20 Karlstad (SE). ANDERSSON, Fredrik; Herrhagsgatan 19, S-652 18 Karlstad (SE). TORSTENSSON, Sören; Solrosvägen 11, S-663 41 Hammarö (SE). BERGLUND, Magnus; Björkrotsvägen 9B, S-653 51 Karlstad (SE). (74) Agents: SANDSTRÖM, Staffan et al.; Bergenstråhle & Lind- vall AB, P.O. Box 17704, S-118 93 Stockholm (SE).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the</i> <i>claims and to be republished in the event of the receipt of</i> <i>amendments.</i>	

(54) Title: A METHOD AND A SYSTEM FOR TRANSMITTING A COOKIE



## (57) Abstract

In a transmission system a proxy server (66) is located between a user terminal (52) and a server (70). The proxy server has means for intercepting and storing cookies transmitted from the server (70) to the user terminal (52). When a server (70) is contacted by a user terminal (52) and the server (70) transmits a cookie to the user terminal (52), the cookie is intercepted and stored in the proxy server (66). Information regarding the remote server, e.g. its URL and an identification identifying the user terminal (52) is stored together with the cookie. The next time the user terminal (52) accesses the same server (70) the proxy server (66) matches the requested URL and the identification information and in this manner finds the stored cookie. The cookie is then added to the request message so that the server (70) is accessed with a copy of the cookie as desired. In this manner the cookies do not need to be stored in the user terminal (52), which may have a small memory and which therefore is not suited for storing cookies. Furthermore, when the user terminal (52) is a mobile terminal the cookie is not transmitted over an air-interface, thereby reducing the risk of eavesdropping significantly.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

A METHOD AND A SYSTEM FOR TRANSMITTING A COOKIE.

#### TECHNICAL FIELD

The present invention relates to a method and a system for transferring cookie information between a client and a server. In particular the invention relates to an end-user or client having access to a small amount of memory and also to a system where the client communicates with the server over a channel having a limited bandwidth.

#### BACKGROUND OF THE INVENTION AND PRIOR ART

In today's Internet applications so called cookies are used more and more frequently.

A cookie is a mechanism developed by the Netscape Corporation to make up for the stateless nature of the hyper text transfer protocol (HTTP) protocol. Normally, each time a browser requests the URL of a page from a Web server the request is treated as a completely new interaction. The fact that the request may be just the most recent in a series of requests as the user browses methodically through the site is lost. Although this makes the Web more efficient, this stateless behaviour makes it difficult to create things like shopping carts that must remember the user's actions over an extended period of time.

Cookies solve this problem. A cookie is a small piece of information, often no more than a short session identifier, that the HTTP server sends to the browser when the browser connects for the first time. A cookie comprises a short instruction followed by a data field of up to 4 kbyte. Thereafter, the browser returns a copy of the cookie to the server each time it connects to the server, which issued the cookie.

Typically the server uses the cookie to remember the user and to maintain the illusion of a session that spans multiple pages. Because cookies are not part of the standard HTTP specification, only some browsers support them, such as "Microsoft Internet Explorer 3.0 and higher, and Netscape Navigator 2.0 and higher. The server and/or its CGI scripts must also know about cookies in order to take advantage of them.

Cookies cannot be used to steal information about a computer system, i.e. they cannot enter a computer system and return with information from it. They can only be used to store information that is provided at some point. Thus, for example, if one fills out a form giving a preferred colour, a server can turn this information into a cookie and send it to the browser used. The next time the browser contacts the site, the browser will return the cookie, allowing the server to alter background colour of its pages to suit the preferences of the user.

However, the information contained in the cookies can of course be intercepted when transferred on the internet. This may not pose such a big problem when the information is transferred on a wireline network or when the information is of a harmless nature, such as colour preferences.

In some cases the information contained in the cookies is confidential and also it sometimes may have to be transmitted over a wireless network, for example when the end user is using a mobile terminal, such as a lap top computer or any other computer communicating via modem over a wireless network. In such a case the confidential information can be eavesdropped fairly easy, since the information is, at least partly, transmitted over an air interface, where it can be intercepted by a number of different equipment.

Also there is a problem associated with the transmission of cookies from different sites since the site cannot determine whether or not the user terminal to which the cookie is sent can receive and store the cookie. Thus, for example, in some hand-held user terminals the amount of memory is very limited and if many sites transmit cookies to such a user terminal, the memory of such a terminal will quite quickly be full of cookies and other, more important, information cannot be stored.

#### SUMMARY

It is an object of the present invention to overcome the problem associated with transmission cookies to a user terminal having a very limited memory and also to reduce the risque for cookie

information to be eavesdropped as outlined above.

This object and others are obtained by locating a proxy server between an end-user and a remote server, which can intercept and store cookies transmitted from a remote server to the user terminal.

Thus, when a remote HTTP server or the like is contacted by a user terminal and the remote server transmits a cookie to the user terminal, the cookie is intercepted and stored in the proxy server. Information regarding the remote server, e.g. its URL and an identification identifying the user terminal or the user is stored together with the cookie. The next time the user terminal or the user accesses the same HTTP server the proxy server matches the requested URL and the identification information and in this manner finds the stored cookie. The cookie is then added to the request message so that the remote server is accessed with a copy of the cookie as desired.

In this manner the cookies do not need to be stored in the user terminal, which may have a small memory and which therefore is not suited for storing cookies. Furthermore, when the user terminal is a mobile terminal the cookie is not transmitted over an air-interface, thereby reducing the amount of data transmitted over the air interface significantly.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described in more detail by way of non-limiting examples and with reference to the accompanying drawings, in which:

- Fig. 1 is a general view of a transmission system comprising a mobile user terminal.
- Fig. 2 is a flow chart illustrating the steps carried out in a proxy server when receiving a URL request from a user terminal.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

In Fig. 1 a general view of a communication network is shown. The network comprises a user terminal 52 having a web browser

54. The user terminal 52 also comprises a wireless modem 58, by means of which the user terminal 52 can connect to a radio base station 60. The radio base station 60 is connected to a remote proxy server 66, which preferably is located at a central location of the transmission system, for example the Home Location Register (HLR) if the system is a GSM-system. The proxy server 66 comprises or is connected to a memory 72 for storing information regarding cookies, which is transmitted via the proxy server 66. The proxy server 66 is connected to the World Wide Web (WWW) or the Internet 68 to which a number of remote servers 70 are connected.

The proxy server 66 can also be located at other locations in the system or distributed over the system. For example, if the transmission system is a GSM-system the cookie information can be stored at the Visiting Location Register (VLR) or even co-located with the radio base station.

In a preferred embodiment for a GSM system the proxy server 66 is located together with the HLR and the VLR and possibly also some of the radio base stations are provided with cache servers for caching cookie information. Similar arrangements can of course be made for other cellular radio systems.

When the user terminal 52 accesses a site for the first time in such a remote server 70, a cookie may be transmitted back towards the user terminal 52. As stated above a cookie is a small piece of information, often no more than a short session identifier, that the HTTP server sends to the browser and may consist of up to 4 kbyte of information.

The cookie is intercepted by the proxy server 66, which stores the cookie together with information regarding the URL that has issued the cookie and an identification identifying the user terminal 52. The cookie will then not have to be transmitted over the wireless network, which usually has a very small bandwidth, typically 4.8 kbit/s, which will reduce the transmission time. Also, there will be no need for storing the cookie in the user terminal 52, which may be a hand-held

computer such as the MC-16 manufactured by the company Ericsson, or a smart-phone, which may have a very limited memory.

The next time the user terminal 52 accesses the same site that issued the cookie, the proxy server 66 will identify the user terminal 52, and check which site or URL (Uniform Resource Locator) the user is accessing. If the site has been accessed previously the proxy server will be able to match the identity with the URL and thereby find the cookie associated with that particular URL.

The proxy server 66 then adds the cookie to the request from the user terminal 52 to the server 70. The remote server 70 will then receive a connection request together with a cookie as if the cookie had been returned from the browser itself. In this manner data traffic over the wireless, low bit-rate part of the access path is reduced and the memory requirement on the user terminal 52 can be reduced.

In Fig. 2 a flow chart of the actions performed in the remote proxy servers when a connection request is received from the user terminal towards a remote server 70 connected to the internet is shown. Thus, first in a block 201 the request from the user terminal 52 is received. Next, in a block 203 the URL, which the user terminal wants to access is read from the request. Thereupon, in a block 205 the identification of the user terminal or user is determined.

The results of the actions performed in the blocks 203 and 205 are then used in a block 207 to determine if the URL previously has been requested or visited by that particular user terminal. Thus, in the block 207 it is checked if there is a cookie stored in the memory 72, which cookie is associated with that particular URL and that particular identification.

If there is a match, i.e. the server previously has stored a cookie for that particular user corresponding to that particular URL, the cookie is added to the request in a block 209 and the request is then forwarded towards the remote server under which

the requested URL is located. If, on the other hand, there is no match in the block 207, i.e. that particular URL is accessed for the first time by that particular user, the request is directly forwarded towards the server 70 in the block 211.

Thus, by storing cookie information in a proxy server, the cookies do not need to be stored in the user terminal, which in many cases have a small memory and which therefore is not suited for storing cookies. Furthermore, when the user terminal is a mobile terminal, the cookie is not transmitted over an air-interface, thereby reducing the amount of data transmitted significantly. Also, the risk of interception of data is reduced by the method and system as described herein.



## CLAIMS

1. A transmission system comprising a user terminal having a browser, which can connect to a remote server, characterized by a proxy server interconnected between the user terminal and the remote server arranged to intercept and to store a cookie transmitted from the remote server to the user terminal.
2. A system according to claim 1, characterized in that the proxy server is arranged to store the cookie together with information regarding the identity of the user terminal or information regarding the user and information regarding the URL that has issued the cookie.
3. A system according to any of claims 1 or 2, when the user terminal and the remote server communicate, at least partly, over a wireless connection via a radio system, characterized in that the proxy server is connected to the radio base stations of the radio system.
4. A system according to claim 3, characterized in that the proxy server is co-located with a central register of the radio system.
5. A system according to claim 4, characterized in that the cookie information is cached at other locations in the system.
6. A system according to any of claims 4 or 5, when the radio system is a GSM-system, characterized in that the proxy server is co-located with the Home Location Register (HLR) of the GSM-system.
7. A method of transmitting a cookie in a system comprising a user terminal having a browser, which can connect to a remote server, via a proxy server interconnected between the user terminal and the remote server, characterized in that a cookie transmitted from the remote server to the user terminal are intercepted and stored by the proxy server.

8. A method according to claim 7, characterized in that the proxy server stores the cookie together with information regarding the identity of the user terminal or information regarding the user and information regarding the URL that has issued the cookie(s).

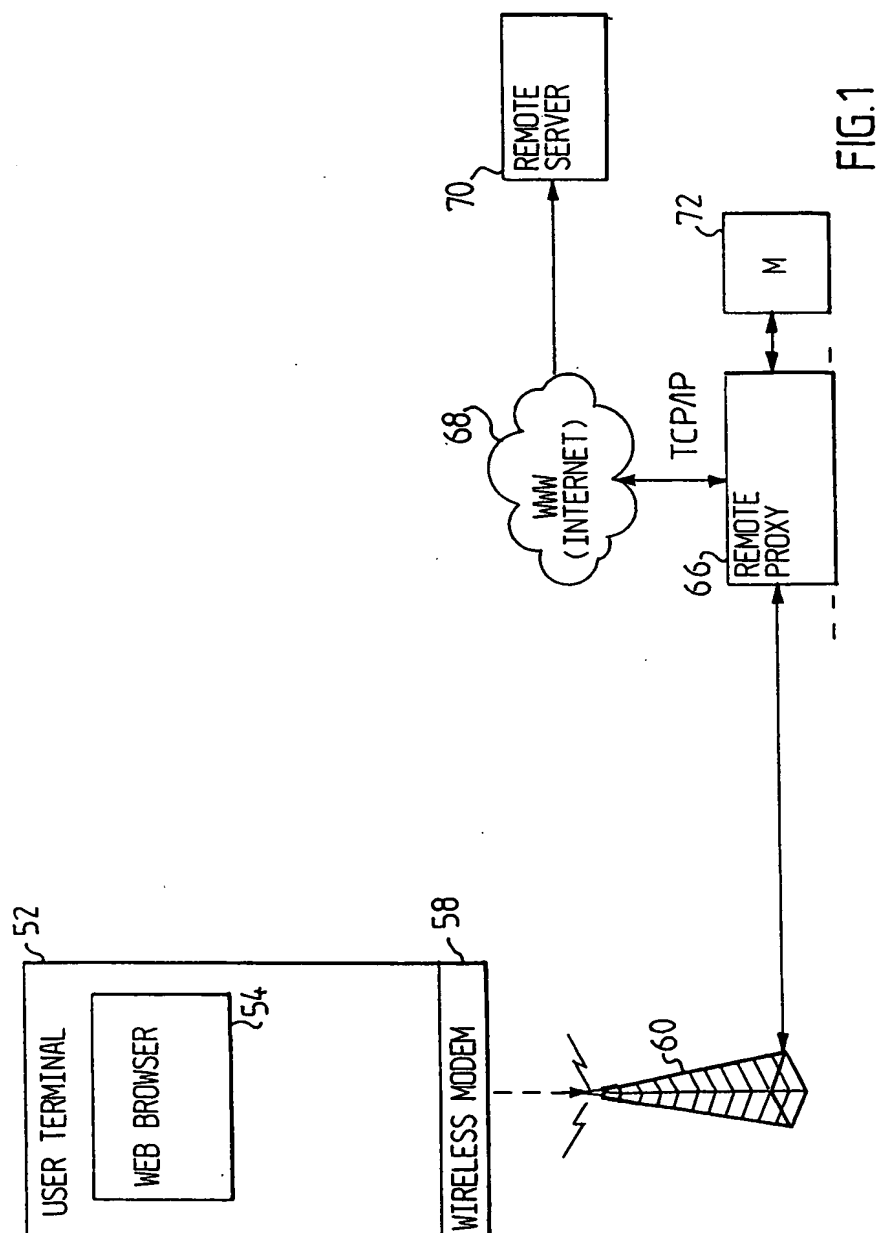
9. A method according to any of claims 7 or 8, when the user terminal and the remote server communicate, at least partly, over a wireless connection via a radio system, characterized in that the proxy server communicates via a high bit rate connection with the radio base stations of the radio system.

10. A method according to claim 9, characterized in that the proxy server is co-located with a central register of the radio system.

11. A method according to claim 10, characterized in that the cookie information is cached at other locations in the system.

12. A method according to any of claims 10 or 11, when the radio system is a GSM-system, characterized in that the proxy server is co-located with the Home Location Register (HLR) of the GSM-system.

1 / 2



2 / 2

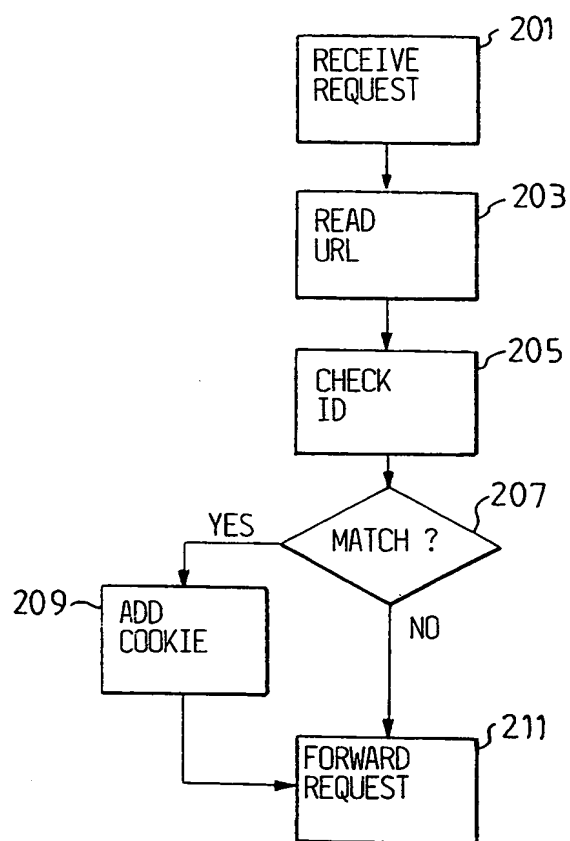


FIG. 2

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00992

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G06F 17/30

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, JAPIO

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	Web techniques, Volume 3, December 1998, Randal L. Schwartz, "Programming With Perl, Making a Cookie Jar" page 28, column 1, line 6 - line 23	1-2,7-8
P,A	page 28, column 1, line 6 - line 23 --	3-6,9-12
A	Amecom Computer Users Club WHO'S WHO AND THE COOKIE April 1997 ZD Internet Magazine retrieved on the Internat URL <a href="http://www.amecom.com/acug/cookie.html">http://www.amecom.com/acug/cookie.html</a> retrieved on: 1999-10-20 see whole document --	1-12

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

21 October 1999

Date of mailing of the international search report

22 -10- 1999

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Oskar Pihlgren/MN

Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00992

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5586260 A (WEI-MING HU), 17 December 1996 (17.12.96), see whole document  --	1-12
A	IBM Technical Disclosure Bulletin, Volume 40, No 2, February 1997, ., "Persistent Context for World Wide Web Browsers" <sup>10</sup> , see whole document  -- -----	1-12

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

### Information on patent family members

**PCT/SE 99/00992**

**28/09/99**

Form PCT/ISA/210 (patent family annex) (July 1992)

**This Page Blank (uspto)**